Economic Modelling 57 (2016) 248–262

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

Youth unemployment and welfare gains from eliminating business cycles — The case of Poland

Jan Acedański

University of Economics in Katowice, ul. 1-go Maja 50, 40-287 Katowice, Poland

ARTICLE INFO

Article history:
Received 14 January 2016
Received in revised form 10 May 2016
Accepted 11 May 2016
Available online xxxx

JEL classification:
E24
E32
E61

Keywords:
Business cycle
Unemployment
Overlapping generations
Welfare
Youth

ABSTRACT

In many countries, business cycle fluctuations of unemployment rate among youth are much higher than that of other cohorts. We investigate how this life-cycle heterogeneity of unemployment risk affects welfare gains from eliminating business cycles in Poland. We use an overlapping generations version of the heterogeneous agent model with aggregate risk and borrowing constraints. We find that accounting for life-cycle heterogeneity of unemployment risk can increase the gains even by 60%. The results also show that consumption of young cohorts drops due to business cycles at least a few times more than the average for the whole population.

1. Introduction

Many empirical studies show that recessions are particularly harmful for young people because the unemployment risk for this group rises much more than for other cohorts. In this paper, we quantify these costs in terms of welfare. More precisely, we study the welfare gains from eliminating business cycles, as well as their distribution across cohorts, while taking into account the life-cycle heterogeneity of unemployment risk.

The problem of the high relative youth unemployment rate as well as its excess sensitivity to business cycles is well documented in the literature (see for example Bruno et al., 2014, Hoynes et al., 2012, Jimeno and Rodriguez-Palenzuela, 2002, Kawaguchi and Murao, 2012). It is particularly severe in Central and Southern Europe. For example in Poland, during the period 1997–2013, the unemployment rate for the 20–24 age group soared, on average, from 24v in booms to 33% in downturns. At the same time, the rates for the 25–60 group were 9 and 13%, respectively. Similar jumps in youth unemployment have been observed in other countries, such as Spain, Bulgaria, Slovakia and Lithuania. The recent financial crisis has been particularly harmful for young people, not only because of the rapid increase in the unemployment rate, which for the whole OECD area rose by 6 percentage points (Bell and Blachflower, 2011; ILO, 2012; Scarpetta et al., 2010), but also because of the high persistence of unemployment. For example, in Greece and Spain, more than 40% of young are still unemployed.

While the welfare costs associated with the high level of youth unemployment have been investigated recently by Chéron et al. (2013) or Michelacci and Ruffo (2015), among others, there are no papers, at least to our knowledge, examining the welfare costs related to the high business cycle volatility of youth unemployment.

The methodology for calculating welfare gains from eliminating business cycles has been developing since the seminal contribution of Lucas (1987). His finding that the gains for an average consumer represent less than 0.01% of lifetime consumption has been challenged from various directions. One important strand of the critique argues that the idiosyncratic consumption risk faced by individuals is much higher than the aggregate data used by Lucas suggest (Atkeson and Phelan, 1994; Beaudry and Pages, 2001; Gomes et al., 2001; Imrohoroğlu, 1989; Krusell et al., 2009; Krusell and Smith, 1999; Mukoyama and Şahin, 2006; Storesletten et al., 2001). Some of the cited papers consider not only the gain for an average agent but also study a distribution of the gains across agents. They identify some

E-mail address: jan.acedanski@ue.katowice.pl.

http://dx.doi.org/10.1016/j.econmod.2016.05.012
0264-9993/

groups of people, especially the poor (Krusell et al., 2009; Krusell and Smith, 1999), the low-skilled (Mukoyama and Şahin, 2006) and the young (Storesletten et al., 2001), for whom the gains are much higher than the average for all agents.

The gain for the poor stems from their inability to insure themselves against unemployment risk, which rises periodically due to business cycles. The high gain from eliminating business cycles for low-skilled workers results mainly from the much higher unemployment risk they face during recessions compared to skilled workers. However, only Storesletten et al. (2001) analyze the life-cycle distribution of the gains. Nonetheless, they do not account for the life-cycle heterogeneity of idiosyncratic risk. In fact, in their setup, the low wealth level coupled with the precautionary motive related to high uncertainty about lifetime earnings is the logic behind the severity of business cycles for young agents.

In this paper, we build on the work of Rios-Rull (1994) and develop an overlapping generations version of the heterogeneous agent model used by Krusell and Smith (1999) and in particular by Mukoyama and Şahin (2006) to account for the life-cycle heterogeneity in unemployment risk. In our setup, agents differ in terms of wealth, skills, labor market status and age. They are subject to idiosyncratic labor market risk. The transition probabilities between employment and unemployment depend not only on an agent's skill level and the aggregate shock but also on age. The model is calibrated using data for the Polish economy. In particular, the transition probabilities are set to match the age profiles of average unemployment rates and durations for workers with different skill levels in booms and recessions.

There are two reasons for using data from Poland. First, as noted earlier, the life-cycle heterogeneity of unemployment risk in Poland is high. However, more importantly, the mean duration of unemployment exceeds one year. This allows us to set up the OLG model at an annual frequency, which considerably facilitates the computations. Besides that, there is one additional feature that makes our baseline calibration of the model unusual, namely, flat unemployment benefits, which in Poland are generally the same for all workers regardless of their previous earnings. However, we also consider a calibration with proportional unemployment benefits. Thus, apart from the unemployment duration and the benefits, our calibration does not differ much from what is used in the literature. Therefore, we think that the insights gained from our study would also apply to other economies with a high volatility of youth unemployment risk.

We consider the welfare gains from two perspectives: a one-period, or momentary, utility of a single cohort and the lifetime welfare of a group of newborn agents. We use the latter perspective as a finite lifetime analogue to the standard measure introduced by Lucas (1987). In our paper, the lifetime gain is defined as a constant percentage increase in consumption of a group of newborn agents in the economy with business cycles needed to equalize the average expected lifetime utility for the agents in the economy with and without business cycles. The momentary gain is calculated in a similar manner, but now we equate the average momentary utilities for certain cohorts. Calculating the welfare gains, we explicitly take into account the transition from an economy with the aggregate risk to the world without it.

To assess the welfare gains from eliminating business cycles, we have to consider a hypothetical economy without business cycles. In particular, one should decide to what extent the idiosyncratic risk is affected by removing the aggregate risk. Due to computational difficulties, we do not apply the integration principle advocated by Krusell and Smith (1999) and Krusell et al. (2009). Instead, we follow Reiter (2012) and consider two possibilities. We assume that the transition probabilities in the economy without business cycles either are set to match the means of unemployment levels and durations for booms and recessions, as in Imrohoroğlu (1989), or simply equal averages of the respective transition probabilities for the two states of the economy. The latter approach is a natural consequence of the non-linearity of the unemployment rate, as recently shown by studies employing search and matching labor market models (Hairault et al., 2010; Iliopulos et al., 2014; Jung and Kuester, 2011; Petrosky-Nadeau and Zhang, 2013). It should also be mentioned that consequences of stabilizing business cycle fluctuations on labor market are also studied by the optimal unemployment insurance literature (Landais et al., 2010; Mitman and Rabinovich, 2015).

Our findings can be summarized as follows. Under a conservative parametrization, the gains from eliminating business cycles for young cohorts are at least two to four times higher than the average for the whole population. In other words, the decline in consumption caused by business cycles is at least a few times higher for young agents. Additionally, we identify a few other reasonable parametrizations where the differences are even more spectacular. We also show that the life-cycle heterogeneity of unemployment risk, disregarded by previous studies, significantly increases the lifetime gains for all type of agents. High volatility of unemployment risk coupled with reduced abilities to self-insure against unemployment risk plays a key role in explaining the fact that majority of the costs associated with business cycles is borne by young agents. We document that eliminating the business-cycle variation in the labor market risk for cohorts 20–29 exclusively can reduce the lifetime gains by as much as 90%. Due to the flat unemployment benefits in Poland, the gains are generally highest for high-skilled workers. This, however, is no longer the case for proportional unemployment benefits.

The rest of the paper is organized as follows. In Section 2, we introduce the model used for studying the gains from eliminating business cycles. Then, in Section 3, we present the calibration of the model's parameters focusing on matching the life-cycle heterogeneity of unemployment risk. Section 4 discusses the issues related to the measurement of the welfare gains within the framework described in Section 2. Results of various numerical simulations are presented in Section 5. Finally, in Section 6, we conclude the paper and briefly discuss two factors excluded from our considerations that are likely to affect the findings of the study.

2. Model

We use an overlapping generations version of the heterogeneous agent model of Mukoyama and Şahin (2006). However, we slightly depart from their setup in a few points. First, because we are not interested in matching wealth distributions, we use the same discount factor for all agents. Second, we allow for negative wealth holdings. We think that the no-debt requirement is an unrealistic assumption in life-cycle frameworks, which, as shown below, considerably increases the welfare gains for young cohorts. Finally, we assume that agents cannot change their skill levels.

2.1. General setup

The economy is populated by a continuum of finitely lived agents who differ in terms of age a, skill level s, employment status ε and wealth k. For simplicity, we omit the time subscripts and use primes to denote subsequent periods. Agents enter the labor market at the age of 20, work for 40 years, then retire and live, at most, up to 99 years. The life length is stochastic.

Young agents either work ($\varepsilon = e$) or are unemployed ($\varepsilon = u$). If employed, they supply $\xi_s \xi_a l$ effective units of labor and obtain the net income $(1-\tau)\xi_s \xi_a l W$, where τ is the tax rate, W stands for the aggregate wage, l is the constant for all agents' nominal labor supply and ξ_s and ξ_a denote the labor efficiency factors related to skill level and age. The unemployed agents receive unemployment benefits. In the baseline version of the model, we assume that the benefit is proportional to the mean wage in the economy and, therefore, is